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VALUING THE COOPERATIVE FIRM BASED ON DISCOUNTED CASH FLOWS

By

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VALUING THE COOPERATIVE FIRM

BASED ON DISCOUNTED

CASH FLOWS

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Abstract: The stock in a cooperative firm is not publically traded but is instead redeemed by the cooperative at book value at some future point in time. This structure eliminates an observable stock price than can be used to infer the value of the firm. Firm value is not generally an important issue for cooperative members but valuation can become critical when members are faced with an outside offer to buy the firm or the cooperative is considering merger with another cooperative. Currently, most cooperative firms are evaluated based on their business assets, with the valuation often based on the historical value on the balance sheet. This can create several issues for the cooperative members. This paper proposed a method of valuing cooperatives based on the discounted projected cash flows. The main purpose of this research is to determine how this method, which is used in other situations, can be applied to the cooperative firm. A six year time series of financial and operating data was obtained for 10 representative Oklahoma cooperatives. In addition to complete financial data the information included data on the physical units of grain, fertilizer and petroleum handled and patron equity records. A cooperative financial simulation program developed at Oklahoma State University was used to develop 10 year projections for the case study cooperatives. The simulations modeled the sales, expenses, profits and profit distributions of the firm and considered the cash flow required for infrastructure reinvestment and equity retirement. The financial projections were used to project the free cash flows of the cooperatives which were then discounted to provide a valuation according to standard methods. In the base case, we found that the future cash flow to equity (FCFE) final value on average was approximately 5.31 times the value of the member's allocated equity while the member value (MV) was approximately 1.88 times the value of the allocated equity and the balance sheet valuation was 2.75 times the value of allocated equity. This implies that the group of case study cooperatives are creating substantial value from their member's investments.

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CHAPTER I

INTRODUCTION

Topic Background

Cooperatives are an important part of the agricultural economy. The U.S. Department of Agriculture (USDA) reported in 2012 that agricultural cooperatives had 2.1 million members, $82.9 billion in assets and $30 billion in equity. Additionally, cooperatives remained a major employer in rural areas, using approximately 130,000 full-time workers. Agricultural cooperatives increased revenues 8.3 percent from 2011 achieving $234.8 billion in gross revenue in 2012, and revenues have increased 60.16 percent over the past 5 years. While the agricultural cooperative sector has continued to grow in terms of revenues and assets, the number of cooperatives has decreased over time along with the number of cooperative members. This is primarily due to mergers among cooperatives. Because many farmers are members of multiple cooperatives, the reported number for both the number of cooperatives and cooperative membership decline when a merger occurs. The USDA reported that since the 1930's the number of agricultural cooperatives in the United States has gradually declined from 12,000 to 2,238 cooperatives in 2012. Likewise, coop memberships have decreased approximately 71 percent since reaching an all-time high during the mid-1950s.

Since the early 1990's many agricultural cooperatives found it necessary to restructure internally to meet the challenges brought forth by a dynamic and rapidly changing agricultural marketplace. Cooperative restructuring activities included expansions, joint ventures, unification, agreement, revampment, and contractions (USDA 2004). Inherently, these actions contribute significantly for the need of members to assess the value of their cooperative.

A cooperative is unique in that it distributes profits to its users in proportion to the volume of business conducted with the firm. This distribution is referred to as a patronage refund or patronage distribution and is a fundamental cooperative principle. This structure is in contrast to that of investor-owned firms where profits are distributed in proportion to ownership. This profit distribution structure creates a number of unique features of the cooperative firm. One of these unique features is the method by which cooperatives acquire equity capital.

While there are minor variations in structure, the traditional open membership is used by over 2,000 agricultural supply and grain marketing cooperatives across the U.S. as well as most dairy and cotton cooperatives (Chaddad and Cook, 2004). These cooperatives are often described as open membership cooperatives because producers can join at any time. To become a voting member and receive patronage from the cooperative, a producer has to purchase a membership share which is often a fairly trivial investment of 50 to 100 dollars. Traditional open membership cooperatives create or accumulate the majority of their equity by retaining profits. This is accomplished in three ways: (1) Retaining a portion of patronage refunds and issuing equity shares to members instead of cash patronage, this is eventually redeemed, (2) Retaining profits from <u>member</u> business, paying corporate taxes on the profits and retaining the after-tax portion as unallocated reserves (retaining earnings), this is never redeemed, and (3) Retaining profits from <u>nonmember</u> business, paying corporate taxes on the profits and retaining the after tax portion as unallocated reserves, which is never redeemed (Chaddad and Cook, 2004). Profit distribution and

retention decisions are at the discretion of the board of directors and impact the cooperative's balance sheet and cash flow as well as the members realized return from the cooperative.

The equity shares which are issued in the first of profit retention strategies described above are generally referred to as "revolving equity." This equity is not tradable but is instead redeemed by the cooperative at its original book value at some later period in time. The present value of allocated equity is less than the face value because of the delay until redemption. Cooperatives use a number of different systems for redeeming equity including systems based on the year the stock was issued, the age of the patron, a percentage pool and other criteria. The average agricultural cooperative revolves equity on an 18 year basis (Cook and Chaddad, 2004). Because unallocated equity does not revolve, the member never receives the profits which were retained as unallocated equity unless the cooperative is dissolved or sold. Cook and Iliopoulos (2000) discuss these issues in the context of what they describe as ill-defined property rights in U.S. cooperatives.

There are alternative cooperatives structures with different equity systems. These include the closed cooperative structure, often referred to as "New Generation Cooperatives" and non-stock cooperatives that accumulate capital through a system of per-unit retains (Cook and Chaddad, 2004). The issues we discuss with regard to cooperative valuation are not as prevalent in those cooperative structures.

Because the revolving equity in a cooperative is redeemed at book value, the payment that the member receives reflects the profit distribution from a previous year and is not impacted by the growth of the firm or the current value of the firm. In contrast to a publically traded firm, there is no observable stock which can be used to infer the value of the firm. The ownership of the stock does not create property rights to future profit distributions. Those distributions are made on the basis of future business volume. Because the stock is not liquid but rather eventually redeemed by the cooperative, the present value to the member depends on the timing and the

system of equity redemption. That timing can be impacted by structural changes in the cooperative. Cooperative members also have property rights to the retained earnings of the firm and this structure creates a gap between their claim under normal operations and their claim if the cooperative is liquidated or restructured.

All of those factors create complications in understanding the value of a member's cooperative equity. Those factors become intertwined with cooperative valuation because when members vote on a decision for cooperative liquidation or restructuring, they are often evaluating an offer at some multiple of the value of their allocated equity. It is therefore useful to discuss these issues in more detail.

The book value of cooperative stock is the most apparent value to the member but it does not represent its present value. The present value of a particular share of cooperative stock depends on the projected time until redemption and the discount rate. In the case of a cooperative redeeming stock based on the year of issue, the various shares of a member's stock would have different present values. In the case of a cooperative using an age of patron plan, the present value of the stock would vary with the age of the member. In terms of the cooperative, the average present value of the stock to the membership can be determined but the value to a particular member is case specific.

The book value of cooperative equity does not fully represent the members' claims on the cooperative's assets. As previously mentioned, cooperatives retain the after tax portion of both member and non-member profits as unallocated equity. Members have a collective claim on the unallocated equity but not an individual claim. When the cooperative remains in operation under its current structure, the member has property rights only to their allocated equity. That equity will eventually be redeemed and the former member will no longer have an ownership claim. However, if the cooperative is dissolved or acquired by another firm at book value, the members

who hold stock in the cooperative have collective property rights to the net worth of the firm, which includes the value of both the allocated and unallocated equity. The rights to the unallocated equity are impacted by bylaw provisions and state legislation but the claim on the unallocated equity is generally proportional to the allocated equity. As the portion of equity held in the form of unallocated equity increases, the divergence between the value of the total equity and book value of allocated equity increases. Of course the actual liquidation value could be above or below the value of the total equity.

If the cooperative continues to operate in its current structure, then the value to the members is represented by future cash patronage plus the eventual redemption of their equity. The member value (MV) would therefore be measured as the present value of future cash patronage payments and equity redemption payments. Cash patronage payments and equity redemption payments represent all the future profit distributions that the member would receive from patronizing the cooperative. By definition, MV is higher than the net present value of allocated equity because it also includes future cash patronage and the eventual redemption of allocated equity which will be issued in the future. MV is one reference that cooperative members could use when evaluating an offer to sell or merge the firm. A merger or restructuring would be beneficial only if the amounts and timing of future patronage and redemption cash flows were projected to change such that MV increased. Assuming that the future cash flows are the only benefit of the cooperative, the members should only liquidate the cooperative if the offer value is above MV. It should be noted that the member's value of their cooperative can be based on more than the cash flows from patronage and equity redemption. It can include the value of favorable prices and services offered by the cooperative, and through its investment in infrastructure, the future value of use of the cooperative's assets. The cooperative model depends on collective investment in a firm that delivers most of its value through use of the cooperative (Reynolds 2014).

The weakness of MV as a measure of the value of the cooperative is that it based on the cash flows projected to be distributed to the member. Those cash flows are in part a function of the cooperative's decision to retain or distribute profits. As an extreme case, a cooperative that elected to retain all profits to grow the firm would have a MV of zero even though the cooperative was growing and generating cash flows. This consideration also applies to privately held business where the owners may or may not be making withdrawals.

There are accepted accounting techniques for estimating the value of these privately held businesses. Business valuation tools include the balance sheet method, EBITDA (earnings before interest, taxes, depreciation, and amortization), and estimated future cash flows (Reynolds 2014). A popular permutation of the estimated future cash flow method is the free cash flow to equity (FCFE) valuation. The FCFE value is a method within the income approach where the present value of future cash flows is calculated using a discount rate. Under this approach, a valuator forecasts operations for a 5 to 10 year period of time along with the final terminal value for the business in the final year of the forecast. In simple terms, FCFE represents the cash that could be potentially available to pay to equity shareholders after all expenses, reinvestment and debt repayment is considered. The future FCFEs are discounted back to the date of the valuation to determine the current firm value. The FCFE valuation has not been previously applied to the cooperative firm.

Business valuations are performed for a number of different reasons, which could include mergers, acquisitions, reorganizations, liquidations, spin-offs, divorces, estate taxes, financing, fairness opinions, or bankruptcy, among other various reasons. The purpose of the assignment will often times influence the methodologies applied and the standard of value used in each specific valuation (Trugman 2013). Several organizations that support the valuation industry such as the *National Association of Certified Valuation Analysts (NACVA)*, the *American Society of Appraisers (ASA)* and the *Appraisal Foundation*. The ASA was established in 1987 and

promulgated a set of standards relative to appraisals referred to as the Uniform Standards of Professional Appraisal Practice (USPAP). These standards are intended to primarily serve real estate appraisals; however, ASA has used its influence to have standards included for other disciplines such as personal property and business valuation (Trugman 2013).

The many different organizations that provide credentials for the business valuation industry also have standards unique to each organization that can cause difficulty in determining the correct standards to apply for each specific engagement. In addition to USPAP, the Appraisal Foundation, the American Society of Appraisers, Institute of Business Appraisers (IBA), American Institute of Certified Public Accountants (AICPA) and NACVA all provide education, accreditation, and publish standards that provide more detail than USPAP, but do not directly conflict with the standards outlined in USPAP. For example, the AICPA issued the Statement on Standards for Valuation Services (SSVS) No. 1, which is currently applicable to all business valuations entered into since January 1, 2008 (Trugman 2013). Any member of the AICPA, who must be a Certified Public Accountant (CPA) in good standing, must follow these standards when conducting a valuation of any business. Although standards are an integral part of ensuring quality business valuations are conducted throughout the industry, the use of professional judgment is a vital component of estimating value. The Internal Revenue Service (IRS) has also provided additional guidance with regards to business valuation issues through revenue rulings.

According to the AICPA, business valuation methodology is based on two principles: "the principle of substitution" and the "principle of future benefits" (Trugman 2013). The principle of substitution states that the value of property tends to be determined by the cost of acquiring an equally desirable substitute. In other words, a person will not purchase a particular asset if such a substitute can be purchased at a lower price. The principle of future benefits states that the economic value of an investment reflects anticipated future benefits, not past performance. Although the past may serve as a proxy for the future, a business that has had poor

earnings in the past but bright prospects in the future will be worth more than a business that has been successful in the past but is not expected to be as profitable in the future. Three interrelated business valuation methods are derived from these principles that are used when engaged to value a business which include the following: income approach, market approach, and an asset based approach. There is no single valuation method that is unanimously applicable in all valuation purposes (Pratt, Reilly, and Schweihs 2000).

Currently, most cooperative firms are evaluated based on their business assets, with the same tools used to value other firms. However, for the member, this does not reflect the time value of money and the time delay until the equity is redeemed for cash. It also does not represent the member's share of the cooperative's retained earnings. Because there is no public market for cooperative stock, analysts must use financial metrics and estimated revenue projections to assess cooperatives as they do with other closely-held businesses. Business valuation tools include the balance sheet method, EBITDA (earnings before interest, taxes, depreciation, and amortization) and estimated future cash flows (Reynolds 2014). However these cash flow based methods have never been specifically related to cooperative valuation partially because of the fact that it is future use and not stock ownership which creates the property rights to those cash flows. It can include the value of favorable prices and services offered by the cooperative, and through its investment in infrastructure, the future value of use of the cooperative's assets. The cooperative model depends on collective investment in a firm that delivers most of its value through use of the cooperative (Reynolds 2014).

There are numerous valuation techniques that can be utilized when valuing an entity ranging from simplistic to complicated financial modeling, such as discounted future economic income methods that include sophisticated financial projections (Kremer, Jarvis, and Wallach 2011). The concept of the discounted economic income method is simplistic in nature, however, the application of this method is very difficult. According to Pratt, Reilly, and Schweihs (2000),

the following are some common errors associated with the discounted economic income method: inappropriately matching the discount rate with the economic income measure, confusing discount rates with capitalization rates, assuming that recent past history represents the best estimate for forecasting economic income, forecasting growth beyond what the capital being valued will support, using an inappropriate number of periods when discounting a terminal value and using assumptions that yield a standard or basis of value that is inappropriate for the specific valuation engagement. It should be noted that the capitalization rate differs from a discount rate in that a capitalization rate is a divisor used to convert a stream of income of a single period into a value, while the discount rate is used to convert a stream of future benefits back to present value (Trugman 2013).

The reasonableness of projections determines the practicability of the discounted economic income method. If the projections utilized in the method are not supportable, the discounted economic income method can convey an appearance of accuracy that is not justified (Pratt, Reilly, and Schweihs 2000). The form, time pattern, uncertainty, and size of returns all influence an estimate of the expected returns from an investment, which affect the required rate of return. For valuation purposes, the measurement of expected returns can take various forms that include earnings, cash flows, dividends, interest payments or capital gains during a period (Reilly 2003).

Research Objectives

The main purpose of this research is to determine how the FCFE valuation can be applied to the cooperative firm and how the resulting value relates to MV based valuations and balance sheet based valuations. The first specific objective is to determine how the FCFE model can be applied to the cooperative firm and estimate FCFE, MV and balance sheet valuations for a series of ten representative case study cooperatives. The second specific objective is to determine how

the FCFE and MV valuations are affected by firm growth, profit distribution and equity management strategies. The third specific objective is to compare the FCFE and MV valuations with traditional balance sheet valuation, including the value of the members' allocated equity, and summarize the implications for cooperative members.

CHAPTER II

REVIEW OF LITERATURE

Value of the Cooperative

Previous research has shown that there is a positive impact on the market provided by the cooperatives' business structure. Reynolds (2014) assessed the value of the cooperative model for members by the use of the cooperative, discounted value of member equity, value of patronage distributions, value of any dividends, and the value of the products and services in supporting a member's life or business. A thriving cooperative has the ability to return profits to their members and support future success by investing in activities that enable these actions to be carried out. This research also acknowledges the positive impact cooperatives can provide to the economy. While this study recognized the concept that the present value of future patronage and equity payments were an important component of the value of the cooperative, the authors did not propose a specific valuation model. However, we will value the cooperative differently by using the discounted cash flow method specifically adjusted for the cooperative business structure.

Agricultural cooperatives have been an integral part to the economy of the United States, Western Europe and other advanced agricultural countries. However, in recent years agricultural cooperatives have declined through bankruptcies, liquidations and conversion to corporations as a result of the agricultural industrialization process that has raised questions about the future viability of the cooperative form of business (Chaddad, Cook, and Heckelei 2005)

Cooperative restructurings are often based on balance sheet valuations, which do not consider the time value of money or the member's share of the cooperative's retained earnings. This highlights the need to compare these traditional balance sheet approaches with the discounted value of future cash flow approach. With respect to the declining numbers of traditional cooperatives, Cook (1995) found that two phenomena were occurring: 1) exiting, restructuring and shifting in response to the property-rights constraints of traditional cooperatives and 2) post-1990 phenomena was the rise of new generation cooperatives. Chaddad and Cook (2004) found that the reason agricultural cooperatives were pursuing new organizational models is because of the investment constraints that arise as a result of free rider, horizon, and portfolio problems present in a traditional cooperative. All of those problems result from the fact that members have little upfront investment in a cooperative and there is no market for cooperative equity. Improved measures of the value of the cooperative would not directly alleviate the investment constraints identified by Cook and Chaddad (2004) and Cook (1995). However, they could lead to new vehicles, such as transfer of equity between members, that would address these structural issues. This research will differ by not looking at the value of the cooperative to the individual member but the value of the cooperative to the member-owners collectively.

One of the unique aspects of the cooperative is that benefits are tied to use. Those benefits do not increase the value of shares of stock or other equity capital in the cooperative business model. By USDA standards the purpose of a cooperative is not to generate a profit for investors, rather it is to provide a service to its user-owners at the lowest possible cost (Frederick and Ingalsbe 1993). Reynolds (2014) defines the value of cooperatives by its ability to pool members' purchasing power to influence the market in significant ways which include the lowering of prices of production inputs. The board of directors' view of the cooperative could potentially have an impact on the firm value. The complexity of the cooperative organization makes it difficult to identify the objective, such as maximizing profits, that is used in most

economic analyses of the firm (Royer 2014). Royer (2014) suggests that a cooperative may pursue several objectives simultaneously and the objectives of the members may not coincide with management objectives. Possible objectives for the cooperative firm could include the maximization of its net earnings, maximization of the per-unit patronage refund and minimization of the net price paid by members, or maximization of member returns. Thus, the lack of defined objectives make it increasingly difficult to define firm value for cooperatives. This is often referred to as an agency problem in the firm.

Cooperative Governance

Directors of cooperatives are responsible for governing their cooperative by distributing profits, developing financing and ownership transfer plans, setting policy and making top-level directional decisions that protect the interest of its individual members as well as the cooperative as a whole. Typically an ineffective board can be a result of poor board orientation and training, strained relationships between the board and management, unqualified or inexperienced individuals, and inadequate nominating procedures (Wadsworth 2000).

Under the cooperative business model, the board of directors makes the decision to distribute the net earnings of the cooperative. This decision has many dimensions including the choice of whether to retain funds in the cooperative or distribute cash to the patron and whether retained funds are allocated to individual members or held as unallocated reserves. Decisions on retaining profits as allocated equity and redeeming previously issued equity for cash impact the cooperative balance sheet and the members return. These decisions involve inherent tradeoffs between direct financial return to the member and the growth and financial stability of the cooperative firm.

Theory of Valuation

The theory of valuation originates with the rulings and pronouncements of the United States Tax Code and the Internal Revenue Service (Kremer, Jarvis, and Wallach 2011). One of the most significant pieces of valuation literature today is Revenue Ruling 59-60 that discusses general approaches, methods and factors to be considered in valuing shares of the capital stock of closely held corporations for estate tax and gift tax purposes. However, the guidelines recommended by Revenue Ruling 59-60 are generally acknowledged as valuation theory for both tax and non-tax issues (Kremer, Jarvis, and Wallach 2011). Section 3 of Revenue Ruling 59-60 outlines an approach to valuation and further addresses difficulties faced by the appraiser. In response to those difficulties, Revenue Ruling 59-60 states that the appraiser should "maintain a reasonable attitude in recognition of the fact that valuation is not an exact science". Revenue Ruling 59-60 also suggests that a theoretically sound valuation shall be based upon all the relevant facts, but common sense, informed judgment and reasonableness should also be considered in the process of evaluating those facts and determining their combined importance.

As discussed previously, the foundation of valuation theory is based upon two principles: "the principle of substitution" and the "principle of future benefits". The principle of substitution is built upon the concept that the value of property is determined by the cost of acquiring an equally desirable substitute. The principle of future benefits states that the economic value of an investment reflects anticipated future benefits, not past performance. Although the past may serve as a proxy for the future, a business that has had poor earnings in the past but bright prospects in the future will be worth more than a business that has been successful in the past but is not expected to be as profitable in the future (Kremer, Jarvis, and Wallach 2011).

According to Pratt, Reilly, and Schweihs (2000), the most theoretically correct approach would be to project some type or types of future benefits, such as cash flows or earnings, and estimate the present value of those future benefits. The present value of those future benefits are found by discounting them based upon the time value of money and the risks associated with the investment. Very few investments can realistically be projected over the entire life of the investment. Thus, a common multistage variation of the discounted future benefits method is applied where the model projects economic income for a finite number of periods, typically 3 to 10 years, and then assumes a terminal or residual value at the end of the projected periods (Pratt, Reilly, and Schweihs 2000). However, while the principle of future benefits theoretical framework is a generally accepted theory for business valuation, it also proves to be one of the most complex challenges of economic and financial theory and practice in the real world (Pratt, Reilly, and Schweihs 2000). The complexity in application along with the complex business structure of a cooperative has led to the utilization of the asset-based approach in most circumstances when valuing cooperatives.

Valuation Discount Rates

The discount rate attempts to assess the risk associated with an investment achieving the estimates of projected future earnings. The numerator is the ultimate driver of what discount rate should be applied when using the discounted future cash flow method. The discount rate must be appropriate for the definition of the economic income in the numerator and for the type of investment being valued (Pratt, Reilly, and Schweihs 2000). Pratt, Reilly, and Schweihs (2000) emphasized that discount rate developed should correspond conceptually and empirically to the designated economic income being used in the discounted future cash flows model.

The basic components of a discount rate include: (1) risk free rate of return and (2) premium for risk. The risk-free rate is the rate available on instruments with essentially no risk. Although risk free securities do not exist, a commonly accepted reference point for risk free rates include U.S. Treasury securities, with the 20 year bond yield being utilized most often for business valuation purposes (Trugman 2013). A premium for risk includes two different types of risks; (1) systematic risk and (2) unsystematic risk. The Equity Risk Premium (ERP) is the premium assessed over and above the risk-free rate of return. Other important elements to consider and incorporate into a discount rate include the degree of minority ownership versus control and the degree of ready marketability or lack of marketability (Pratt, Reilly, and Schweihs 2000).

Schall, Sundem and Geijsbeek (1978) surveyed 424 large U.S. corporations to inquire about their capital budgeting techniques. In regard to the discount rate, 46 percent of respondents used the firm's weighted average cost of capital, 20 percent used a measure based on past experience, 17 percent used the cost of debt, 17 percent used expectations of growth and dividend payout, 9 percent used the cost of equity and 8 percent used the risk free rate plus a risk premium. Among the sub set of respondents that gave a numerical value, the average after tax discount rate was 11.4 percent and the average before tax discount rate was 14.3 percent.

Agricultural economists have tended to apply somewhat lower discount rates relative to those in business investments. For example, Richardson et. al. (2007) used a 7.5 percent discount rate in evaluating ethanol projects. Reid and Bradford (1983) examined rates between 3 percent and 9 percent in determining the optimal replacement of farm tractors. Boyer et. al. (2008) used a discount rate of 6.125 percent in evaluating irrigation projects in South Texas. The Natural Resources Conservation Service (NRCS) regularly conducts economic analysis of Federal funds for conservation and farm-level investments to assist farmers for their conservation related investment decisions. The Office of Management and Budget (OMB) issued Circular A-94 that

recommends that discount rates for non-water resources with external social benefits at a 7 percent real rate as the base case. This 7 percent base rate is a broad measure that is meant to reflect returns to private capital in recent years. OMB Circular A-94 also provides a lower case sensitivity analysis of a 3 percent real rate and a higher case sensitivity analysis of a 10 percent real rate.

Discount for Lack of Marketability

The previous literature on firm valuation supports the use of a discounted future cash flow approach. This requires an accurate projection of the future cash flows and the use of an appropriate discount rate. Conceptually the discount rate should reflect the risk free rate of return with appropriate adjustments for risk, lack of marketability and lack of control. Typical discount rates for capital budgeting projects in large U.S. corporations appear to be in the 11 percent to 14 percent range while rates of 3 percent to 9 percent have been applied in agricultural projects. Adjustments for the lack of marketability could justify a substantially higher discount rate. The lack of marketability adjustment has never been specifically applied to agricultural cooperatives.

During the course of conducting a valuation engagement, SSVS No. 1 acknowledges the responsibility of the analyst to consider whether the valuation needs adjustments, such as discounts and premiums due to of lack of marketability (liquidity) or lack of control (Trugman 2013). A lack of control discount is assessed when a minority shareholder is unable to effectively influence the operations or results of the business (Trugman 2013). One element specific to a cooperative is that there is not a readily accessible market. The fact that there is not a readily accessible market increases the risks of ownership due to an inability to achieve liquidity within a short period of time. The ASA has defined lack of marketability in their *Business Valuation Standards* as, “an amount or percentage deducted from the value of an ownership interest to reflect the relative absence of marketability”.

Pratt, Reilly, and Schweihs (2000) outlined 12 empirical studies on restricted stock transactions of publicly traded companies, which covered several hundred transactions from the late 1960s through 1998 as well as studies from private transactions before initial public offerings spanning over 30 years and covering hundreds of transactions. Average discount prices from the restricted stock studies ranged from 13 percent to 45 percent, while the average discount prices from the private transactions compared to public market prices varied from 40 percent to 72 percent, after all outliers were eliminated. It is not uncommon for the discount for lack of marketability (DLOM) to be 50 percent under certain circumstances or greater. The benchmark that is typically used to assist in determining the DLOM is an actively traded stock of a public company that could easily be sold at or very near the last reported transaction price by a mere phone call to a broker or trading online where the cash would be received within three business days (Pratt, Reilly, and Schweihs 2000). The discount applied for lack of marketability should not be confused with a discount applied for lack of control. According to Pratt, Reilly, and Schweihs (2000), lack of control is reflected in the projected cash flows as a result of control adjustments whereas a marketability adjustment is the ability to sell the interest without loss of value to receive cash quickly.

It is not clear how the potential adjustment for lack of marketability applies to agricultural cooperatives. The lack of liquidity of cooperative stock has long been recognized. That would argue for a marketability adjustment to the discount rate. On the other hand, an agricultural cooperative is an extension of the farm business. Members establish cooperatives and presumably, continue to invest in them because of their role in sourcing inputs and in marketing commodities which are integral with the farm production operation. The only rationale for investing in a private firm is the return on the investment. Private firm investors would therefore expect to command a higher return for a non-liquid (low marketability) firm. Farmers invest in their local cooperative partially because it is located near their farming operation. In

addition to returns at the cooperative level, it may improve the profitability of their farming operation by reducing their transportation distance or providing specialized services. It is therefore not clear that the discount rate used to evaluate cooperative cash flows should be increased because of low marketability. An equally compelling argument could be made that it should be reduced because of synergy effects.

When applying real discount rates, it is imperative that it is consistently applied to real dollars or a nominal discount rate is applied to nominal dollars. Mismatching of a nominal discount rate with real benefits and costs or vice versa will lead to inaccurate results. The baseline discount rate of 13 percent used in our validation model is typical of the rates that been applied in U.S. corporations in capital budgeting projects. We examine lower discount rates in our sensitivity analysis that have been applied in the agricultural economics literature.

CHAPTER III

METHODOLOGY

Conceptual Framework and Hypotheses

Hypothesis 1:

H1: Discounted cash flow valuations will be higher than balance sheet based valuations and member value. In the cooperative, the value of the equity does not reflect future cash flows of the firm nor the amount of future cash patronage and equity redemption distributions to members. We anticipate that the present value of these cash flows will have a major impact on valuation.

Hypothesis 2:

H2: The MV valuation will be sensitive to the cooperative's profit distribution and equity management strategies. This is anticipated because MV is measured by cash patronage payments and equity redemption payments that will be realized by the members based on allocation of profits and equity redemption. If this hypothesis is validated, it would have important implications for a cooperative board of directors as they select profit distribution and equity management strategies.

Hypothesis 3:

H3: The FCFE valuation will be more sensitive to the assumed discount rate than to profit distributions, equity strategy or growth rate. Because it is based on cash flows that can potentially be distributed to members rather than projected actual distributions, the FCFE valuation should be largely unaffected by profit distribution and equity management strategies. We anticipate that the discount rate will have the largest impact on the FCFE valuation. If this hypothesis is validated, more research on the appropriate discount rate to use in the setting of an agricultural cooperative may be justified.

Comparison of Valuation Methods

The FCFE and MV valuation approaches both reflects the time value of money concept while the asset-based approach does not. However, the advantage of using the asset based approach is the simplicity in calculation while the disadvantage of using this approach is that it does not reflect future value or earning potential of the firm. An advantage of using the FCFE is that the method captures all of the cash flows of the firm while the disadvantage of this approach stems from the difficulty in application. The advantage of the MV valuation method is that it reflects the cash flows the member would receive from continued use of the cooperative. However, the disadvantage with the MV approach arises because the MV cash flows are dependent upon each firms profit distribution and retention strategy.

Methods and Procedures

Valuation Methodology

In this research, the business valuation methodology used was the principle of future benefits. The principle of future benefits states that the economic value of an investment reflects anticipated future benefits, not past performance. Based on the principle being applied, there are three different business valuation approaches that could be applied: asset approach, income approach, or market approach (Kremer, Jarvis, and Wallach 2011). Both the asset approach and

income approach are applicable to the cooperative firm. According to Kremer, Jarvis, and Wallach (2011), the principle of substitution represents an amount that a seller and buyer are willing to exchange for a similar asset in the open market. We deemed this method inappropriate for this research since there is not an open market for the cooperative firm. We obtained audited financial statements for each cooperative for the most recent fiscal years from 2009 to 2014 that assisted in our projected future cash flows. The previous 6 years of financial information was long enough to be representative of each firm. Financial information extended past the previous 6 years would not be as representative of the firms because too much structural change in the organization would occur.

According to Pratt, Reilly, and Schweihs (2000), the most theoretically correct approach would be to project some type or types of future benefits, such as cash flows or earnings, and estimate the present value of those future benefits. The discounted future earnings return method is an income approach method based on the principle of future benefits. This method forecasts earnings, which would include a final value for the cooperative in the final year of the forecast, and discounts the future cash flows back to the valuation date. By definition the discount rate is the cost of capital that converts all of the expected future returns on an investment to a present value (Pratt, Reilly, and Schweihs 2000).

For the purpose of a valuation, the definition of cash flow differs from other traditional accounting definitions of cash flows. The method in which net cash flow is derived depends on whether the valuation analysis is valuing the equity or the invested capital of the organization (Trugman 2013). Cooperative's equity is created from retained profits and not investments in capital, thus the most appropriate measure with respect to cooperative would be to value the firm's equity. The American Society of Appraisers (ASA) define equity net cash flows in their *Business Valuation Standards* as, "Those cash flows available to pay out to equity holders (in the form of dividends) after funding operations of the business enterprise, making necessary capital

investments, and increasing or decreasing debt financing." We derived the net cash flows used in this research by the following formula:

	Operating Income (EBIT)
Less:	Taxes
=	After tax income
Less:	Interest
=	Net income
Plus:	depreciation & amortization
=	Gross cash flow
Less:	Increase in working capital
Less:	Capital expenditures
+/-	Change in debt principal
=	Free Cash Flows to Equity

This research breaks down the discount rate into the following two components: (1) risk-free rate and (2) equity risk premium. The discount rate was calculated by the following formula:

$$k = R_f + ERP$$

k = discount rate

R_f = risk-free rate

ERP = equity risk premium

The Federal Reserve Bank of St. Louis listed a constant maturity rate of 3.07 percent for a 20-year treasury note as of August 4, 2014; thus, for this research we used 3.00 percent for our risk-free rate component of the discount rate. The equity risk premium was used to capture additional risk related to the cooperative industry above the minimum risk assumed, as set by the risk free rate. A lower equity risk premium signifies a low risk investment, whereas a high equity

risk premium signifies a more risky investment. The equity risk premium was calculated by the following formula:

$$ERP = R_m - R_f$$

ERP= equity risk premium

R_m= Risk of Market

R_f= Risk free rate of return

This research assumed a 10 percent risk of market less a risk free rate of return of 3 percent to derive the equity risk premium, which is consistent with the rates used by U.S. corporations in capital budgeting projects. Due to the lack of consensus on the appropriate discount rate, we examine a range of possible discount rates in our sensitivity analysis.

Discount Future Cash Flow Method

The discounted future cash flow method forecasts operations, typically 5 years up to 10 years, includes a residual value for the business in the final year of the projection, and discounts the future cash flows back to the present value (Kremer, Jarvis, and Wallach 2011). After deriving the net cash flows and discount rate, we calculated the present value of the future expected equity net cash flows with the following formula:

$$PV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \frac{CF_4}{(1+k)^4} + \cdots + \frac{CF_{10}}{(1+k)^{10}}$$

PV= present value of expected cash flows for the cooperative

CF= free cash flows to equity

k= discount rate

Operations for each cooperative were forecasted for 10 years with the residual value calculated as:

$$RV = (CF_{10} \times (1+G))/(k-G) \times (\frac{1}{1+k})^{10}$$

RV= residual value

CF=equity net cash flows

G= growth rate

k=discount rate

The residual value represents the value of an annuity that is generating the year 10 cash flow, adjusted back to present value. It should be noted that the simulation analysis generated a complete set of pro forma financial statements including a projected balance sheet for year 10. It was concluded that the calculation described above provided a more consistent and defendable estimate of the terminal value since the balance sheet value was impacted by patronage distribution and equity redemption. The projected balance sheet values in year 10 were typically considerably higher (4 to 10 times) than the calculated terminal value.

We assumed a real growth rate of 5 percent with no inflation assumptions for either revenue or costs, which was a conservative approach as compared to the average growth rate of 18.56 percent in the total assets of the case study cooperatives during the previous 6 years for which we collected financial data. According to the USDA, total asset growth rate for farmer, rancher, and fishery cooperatives averaged 3.00 percent since 2009. We elected not to use firm specific growth rates because of the "lumpiness" on infrastructure reinvestment. A cooperative with a higher asset growth rate likely replaced major assets such as grain bins or fertilizer warehouses. It is likely that their long term asset growth would be lower than the recent historical average. Similarly, cooperatives with low asset growth rates are likely to increase infrastructure investment in future years. The use of a real growth rate with no inflation assumptions could potentially overstate the value of the equity retirement because inflation does reduce its value to the member. However, a relatively higher base discount rate was used in order to compensate for an inflation rate.

In addition to the discounted cash flows and the residual value, we also considered the present value of each cooperative based on their actual cash on hand, long term investments, and long-term debt for the most current historical period. A company with cash on hand or long term investments will be more highly valued, whereas purchasing a company with substantial debt obligations will decrease the value of the company being acquired. The long term investments were primarily equity in regional cooperatives for each cooperative analyzed. These additional factors were added into the final valuation formula in order to find the present value of the cooperative. The final value of the cooperative was derived by the following formula:

	Present value of discounted cash flows
Plus:	residual value
Plus:	cash
Plus:	long-term investments
Less:	long-term debt
=	Final FCFE Value of Cooperative

In light of the ambiguity as to the appropriateness of a marketability adjustment and the lack of any previous studies to suggest the appropriate level, we elected to not include an explicit adjustment.

Asset Based Valuation Method

We then compared the final value of each cooperative based on the discounted cash flow method with the asset based valuation of the cooperative. The total equity was calculated as follows:

$$Total\ Equity = Total\ Assets - Total\ Liabilities$$

Member Value Valuation Method

We also compared the FCFE final value of each cooperative with the member value that was measured as the present value of future cash patronage payments and equity redemption

payments. After deriving the cash flow to members and discount rate, we calculated the present value of the future expected member returns with the following formula:

$$PV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \frac{CF_4}{(1+k)^4} + \cdots + \frac{CF_{10}}{(1+k)^{10}}$$

PV= present value of expected cash flows for the cooperative

CF= Sum of cash patronage and equity redemptions

k= discount rate

Simulation Methodology

A six year time series of financial and operating data was obtained for 10 representative Oklahoma cooperatives. In addition to complete financial data, the information included data on the physical units of grain, fertilizer and petroleum handled and patron equity records. A cooperative financial simulation program developed at Oklahoma State University was used to develop 10 year projections for the case study cooperatives (Kenkel,2013 and Kenkel and Holcomb,2005). The simulations modeled the sales, expenses, profits and profit distributions of the firm and considered the cash flow required for infrastructure reinvestment and equity retirement. The financial projections were used to project the free cash flows of the cooperatives which were then discounted to provide a valuation according to the standard methods (Appendix A).

CHAPTER IV

FINDINGS

Cooperative Demographics

The 10 Oklahoma cooperatives' financial data that was obtained had an average of $12,875,703 in total assets, $7,872,893 in total equity with an average unallocated to total equity ratio of 57 percent, $2,552,687 in total working capital, $24,195,153 in sales of which an average of 83.4 percent was from member business, and a total fixed asset growth rate of 12.1 percent as of the last fiscal year of audited financial statements. Exactly half of the cooperatives were on an age of patronage equity redemption system with the other half on a stock equity redemption system with an average age trigger of 67 years and average revolving period of 20 years.

Valuation Results

For our initial base analysis, we used a discount rate of 13 percent with a 5 percent asset growth rate as outlined previously in our methodology and procedures section. Based on these attributes, the FCFE final value on average was approximately 5.31 times the value of the member's allocated equity. The MV was approximately 1.88 times the value of the allocated equity while the balance sheet valuation was 2.75 times the value of allocated equity. Table 1 reports the total dollar value under each methodology for each cooperative. Table 2 reports the ratio of final value to allocated equity individually for all cooperatives.

The aforementioned results are consistent with hypothesis one, “FCFE valuations will be higher than balance sheet based valuations and MV.” After an initial analysis was conducted based on a discount rate of 13.00 percent and a 5.00 percent growth rate, we further ran a sensitivity analysis by changing the discount rate and growth rate. The asset based valuation remains unaffected by these changes because the valuation is dependent only upon the most recent year of historical financial information. The ratio of FCFE to allocated equity averaged 7.92 and the ratio of MV to allocated equity averaged 2.14 when the discount rate was lowered to 10 percent (Table 3). The FCFE value for each cooperative increased on average by approximately 48 percent, ranging from 31 percent to 58 percent increase and the MV approximately increases 14.1 percent on average for each cooperative (Table 4). The discount rate was further decreased to 8 percent with a 5 percent asset growth rate held constant that resulted in an even larger percent increase in the final value for both the FCFE and MV. The average FCFE ratio and MV ratio to allocated equity increased to 12.53 and 2.35, respectively (Table 5). The FCFE value for each cooperative increased on average by approximately 132.7 percent while the MV approximately increased 25.4 percent on average (Table 6). The FCFE final value considered the discount rate not only in the present value of cash flows, but also in the calculation of the terminal value; thus, it was expected that the FCFE value would be increased at a greater rate than the MV by the change in discount rates.

A sensitivity analysis was also considered for the asset growth rate used to project future cash flows and a terminal value. The analysis considered a higher asset growth rate of 7 percent as well as a lower asset growth rate of 3 percent. As expected, the FCFE value and MV value both increased when the asset growth rate increased. The average FCFE and MV ratio to allocated equity increased to 6.38 and 1.95 respectively with a 7 percent asset growth rate (Table 7). The FCFE value for each cooperative increased on average by approximately 19.8 percent while the MV approximately increases 3.8 percent on average for each cooperative (Table 8). The

asset growth rate was then decreased to 3 percent with a 13 percent discount rate held constant that resulted in a decrease in the final value for both the FCFE and MV. The average ratio of FCFE to allocated equity decreased to 4.04, while the average ratio of MV to allocated equity decreased to 1.81 (Table 9). These results are consistent with the expectations of hypothesis 3 where the FCFE valuation was changed at a greater rate when the discount rate was altered compared to when the asset growth rate was altered.

Table 1. Base Valuation Results based on a 13% discount rate and 5% asset growth rate

Cooperative	FCFE Final Value	Equity Final Value	MV Final Value
A	$ 11,899,102	$ 5,570,140	$ 4,295,435
B	6,751,911	5,964,110	2,266,014
C	13,126,039	7,355,629	5,212,662
D	12,431,691	5,039,426	5,565,977
E	3,265,766	1,991,065	1,336,777
F	63,443,280	31,464,016	19,326,612
G	8,353,078	5,044,411	2,026,336
H	7,837,486	4,123,563	1,224,794
I	8,516,044	3,711,194	3,864,425
J	15,290,548	5,750,140	5,637,347
Average	15,091,495	7,619,369	5,075,638

Table 2. Ratio of final value to allocated equity on a 13% discount rate and 5% asset growth rate

Cooperative	FCFE Final Value	Equity Final Value	MV Final Value
A	8.20	3.96	2.96
B	4.85	4.28	1.63
C	4.47	2.51	1.78
D	5.06	2.05	2.26
E	2.88	1.76	1.18
F	5.38	2.67	1.64
G	2.85	1.72	0.69
H	5.46	2.88	0.85
I	7.69	3.35	3.49
J	6.28	2.36	2.32
Average	5.31	2.75	1.88

Table 3. Ratio of final value to allocated equity on a 10% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	12.46	3.96	3.38
B	7.14	4.28	1.86
C	6.76	2.51	2.03
D	7.72	2.05	2.58
E	4.26	1.76	1.35
F	7.63	2.67	1.87
G	3.72	1.72	0.79
H	8.64	2.88	0.98
I	11.75	3.35	3.98
J	9.09	2.36	2.65
Average	7.92	2.75	2.14

Table 4. Percent change of final value from base with a 10% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Member Cash Flow Final Value
A	52.0%	14.3%
B	47.2%	14.2%
C	51.2%	14.4%
D	52.5%	13.7%
E	47.8%	14.1%
F	41.9%	13.9%
G	30.6%	14.2%
H	58.1%	14.6%
I	52.8%	13.9%
J	44.6%	14.2%
Average	47.9%	14.1%

Table 5. Ratio of final value to allocated equity on an 8% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	20.02	3.96	3.71
B	11.19	4.28	2.04
C	10.83	2.51	2.23
D	12.42	2.05	2.82
E	6.70	1.76	1.48
F	11.62	2.67	2.05
G	5.26	1.72	0.87
H	14.27	2.88	1.08
I	18.95	3.35	4.36
J	14.06	2.36	2.91
Average	12.53	2.75	2.35

Table 6. Percent change of final value from base with an 8% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Member Cash Flow Final Value
A	144.3%	25.5%
B	130.7%	25.4%
C	142.2%	25.7%
D	145.5%	24.6%
E	132.6%	25.3%
F	116.0%	25.0%
G	84.8%	25.5%
H	161.2%	26.1%
I	146.4%	24.9%
J	123.7%	25.5%
Average	132.7%	25.4%

Table 7. Ratio of final value to allocated equity on a 13% discount rate and 7% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	9.94	3.96	3.07
B	5.82	4.28	1.69
C	5.56	2.51	1.88
D	5.93	2.05	2.30
E	3.46	1.76	1.23
F	6.26	2.67	1.69
G	3.24	1.72	0.72
H	6.78	2.88	0.88
I	9.29	3.35	3.60
J	7.55	2.36	2.43
Average	6.38	2.75	1.95

Table 8. Percent change of final value from base with a 13% discount rate and 7% asset growth rate

Cooperative	Discounted FCFE Final Value	Member Cash Flow Final Value
A	21.3%	3.7%
B	20.0%	3.9%
C	24.3%	5.8%
D	17.3%	1.4%
E	20.1%	4.0%
F	16.4%	3.1%
G	13.9%	4.9%
H	24.0%	3.4%
I	20.8%	3.2%
J	20.1%	4.8%
Average	19.8%	3.8%

Table 9. Ratio of final value to allocated equity on a 13% discount rate and 3% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	7.11	3.96	2.85
B	4.25	4.28	1.57
C	3.80	2.51	1.68
D	4.51	2.05	2.23
E	2.52	1.76	1.13
F	4.83	2.67	1.59
G	2.60	1.72	0.66
H	4.64	2.88	0.83
I	0.67	3.35	3.38
J	5.50	2.36	2.21
Average	4.04	2.75	1.81

Table 10. Percent change of final value from base with a 13% discount rate and 3% asset growth rate

Cooperative	Discounted FCFE Final Value	Member Cash Flow Final Value
A	-13.3%	-3.6%
B	-12.5%	-3.8%
C	-15.1%	-5.5%
D	-10.9%	-1.6%
E	-12.6%	-3.9%
F	-10.2%	-3.0%
G	-8.7%	-4.8%
H	-15.0%	-3.4%
I	-91.3%	-3.2%
J	-12.4%	-4.6%
Average	-20.2%	-3.7%

Profit Distribution and Equity Redemption System

The majority of the 10 cooperatives chosen for this case study distributed profit evenly in the form of cash patronage and qualified stock with the exception of cooperative G, H, and J. Cooperative H was the only cooperative that distributed profits in the form of nonqualified stock (Table 11). We ran a sensitivity analysis for MV on profit distribution practices where an additional 5 percent of profits were distributed as cash patronage. In theory, cooperatives could distribute 100 percent of profits in the form of cash patronage, but this would be very difficult to accomplish in practice. On average, the MV increased by 11.12 percent when cash patronage was increased by 5 percent (Table 13). We also ran a sensitivity analysis for MV for equity management strategy where we decreased the equity redemption revolving period by 1 year. As shown in table 13, many of the cooperatives were unaffected by this change with the average MV increased 0.69 percent for the 10 case study cooperatives.

Table 11. Percent of profit distribution

Cooperative	Cash Patronage	Qualified Stock	Non-qualified Stock
A	50%	50%	0%
B	50%	50%	0%
C	50%	50%	0%
D	50%	50%	0%
E	50%	50%	0%
F	50%	50%	0%
G	21%	79%	0%
H	15%	0%	85%
I	50%	50%	0%
J	70%	30%	0%

Table 12. Equity redemption system

Cooperative	Age or Stock	Age trigger	Revolving period (years)
A	Age	70	20
B	Stock	65	15
C	Age	65	15
D	Stock	68	30
E	Age	68	20
F	Age	68	20
G	Stock	68	25
H	Stock	68	20
I	Stock	68	20
J	Age	70	20

Table 13. Percent change in member value with a 5% increase in cash patronage and 1 year decrease in equity redemption

Cooperative	5% increase in cash patronage	1 year decrease in equity redemption
A	8.41%	0.00%
B	8.26%	2.31%
C	8.59%	0.00%
D	9.41%	1.30%
E	7.60%	0.00%
F	7.78%	0.00%
G	18.93%	0.08%
H	27.46%	3.03%
I	8.43%	0.18%
J	6.28%	0.00%
Average	11.12%	0.69%

EBITDA Analysis

Many firms compare the firm value with Earnings before, interest, taxes, depreciation and amortization (EBITDA) when analyzing comparative values. For our initial base analysis with an assumed discount rate of 13 percent with a 5 percent asset growth rate, the FCFE final value on average was approximately 8.14 times that of the cooperatives EBITDA (Table 14). The MV was approximately 2.81 times greater than the cooperatives EBITDA while the balance sheet valuation was 4.37 times greater than the cooperatives EBITDA (Table 14). During the discount rate sensitivity analysis, these multiples further changed. With a discount rate of 10 percent, the average FCFE and MV final value was 11.83 and 3.21 times greater than the cooperatives EBITDA, respectively (Table 15). When the discount rate was further decreased to 8 percent, the average FCFE and MV final value was 18.39 and 3.52 times greater than the cooperatives EBITDA, respectively (Table 16). These multiples were all greater than the multiples compared to allocated equity of the cooperative firm.

Table 14. Ratio of final value to EBITDA on a 13% discount rate and 5% asset growth rate

Cooperative	Discounted Cash Flow Final Value	Equity Final Value	Member Cash Flow Final Value
A	4.72	2.28	1.71
B	4.62	4.08	1.55
C	3.94	2.21	1.57
D	13.12	5.32	5.87
E	13.37	8.15	5.47
F	6.22	3.09	1.90
G	18.32	11.07	4.45
H	5.07	2.67	0.79
I	4.53	1.97	2.05
J	7.51	2.82	2.77
Average	8.14	4.37	2.81

Table 15. Ratio of final value to EBITDA on a 10% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	7.18	2.28	1.95
B	6.80	4.08	1.77
C	5.96	2.21	1.79
D	20.01	5.32	6.68
E	19.77	8.15	6.25
F	8.83	3.09	2.16
G	23.93	11.07	5.08
H	8.01	2.67	0.91
I	6.92	1.97	2.34
J	10.86	2.82	3.16
Average	11.83	4.37	3.21

Table 16. Ratio of final value to EBITDA on an 8% discount rate and 5% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	11.54	2.28	2.14
B	10.67	4.08	1.95
C	9.55	2.21	1.97
D	32.20	5.32	7.32
E	31.11	8.15	6.86
F	13.44	3.09	2.37
G	33.87	11.07	5.58
H	13.24	2.67	1.00
I	11.16	1.97	2.57
J	16.79	2.82	3.47
Average	18.39	4.37	3.52

During the asset growth rate sensitivity analysis, these multiples further changed. With an increase in asset growth rate to 7 percent, the average FCFE and MV final value was 9.65 and 2.91 times greater than the cooperatives EBITDA, respectively (Table 17). When the asset growth rate was decreased to 3 percent, the average FCFE and MV final value was 6.85 and 2.71 times greater than the cooperatives EBITDA, respectively (Table 18). These multiples were all greater than the multiples compared to allocated equity of the cooperative firm.

Table 17. Ratio of final value to EBITDA on a 13% discount rate and 7% asset growth rate

Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	5.73	2.28	1.77
B	5.55	4.08	1.61
C	4.90	2.21	1.66
D	15.38	5.32	5.96
E	16.06	8.15	5.69
F	7.24	3.09	1.95
G	20.88	11.07	4.66
H	6.29	2.67	0.82
I	5.47	1.97	2.12
J	9.02	2.82	2.90
Average	9.65	4.37	2.91

Table 18. Ratio of final value to EBITDA on a 13% discount rate and 3% asset growth rate

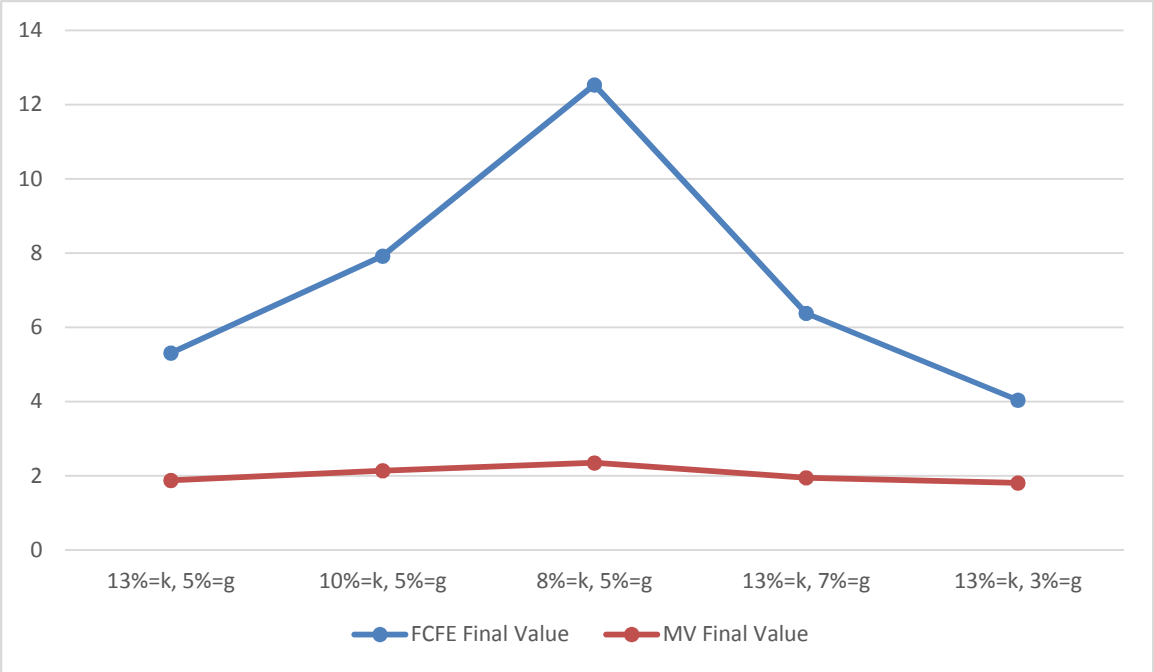
Cooperative	Discounted FCFE Final Value	Equity Final Value	Member Cash Flow Final Value
A	4.10	2.28	1.64
B	4.05	4.08	1.49
C	3.35	2.21	1.48
D	11.69	5.32	5.78
E	11.69	8.15	5.26
F	5.59	3.09	1.84
G	16.73	11.07	4.23
H	4.31	2.67	0.77
I	0.39	1.97	1.99
J	6.58	2.82	2.64
Average	6.85	4.37	2.71

Summary of Results

Table 19. Summary of Sensitivity Analysis Results

Description	Average Ratio to Allocated Equity	Average Ratio to EBITDA
FCFE (k=13%, g=5%)	5.31	8.14
Asset (k=13%, g=5%)	2.75	4.37
MV (k=13%, g=5%)	1.88	2.81
FCFE (k=10%, g=5%)	7.92	11.83
MV (k=10%, g=5%)	2.14	3.21
FCFE (k=8%, g=5%)	12.53	18.36
MV (k=8%, g=5%)	2.35	3.52
FCFE (k=13%, g=7%)	6.38	9.65
MV (k=13%, g=7%)	1.95	2.91
FCFE (k=13%, g=3%)	4.04	6.85
MV (k=13%, g=3%)	1.81	2.71

Figure 1. Change in Average Ratio to Allocated Equity based on sensitivity analysis



CHAPTER V

IMPLICATIONS AND CONCLUSIONS

Implications

As mentioned previously, cooperative members hold allocated equity which is redeemed at face value at some later date. A naïve cooperative member considering an offer to liquidate or transform the cooperative might consider an amount equal to or greater than their allocated equity value as a fair or attractive offer. Our valuation results provide information which would improve the member's understanding of the value of their share of the cooperative. All of the valuations were substantially above the value of allocated equity. If the member considered the value of the unallocated equity, they could focus on our balance sheet valuation, which on average was 2.75 times that of the allocated equity value.

If the member considered the cash flows that they would receive during the next 10 years, they would focus on our MV valuation. On average, the MV valuation was 1.88 times greater than the allocated equity value, which is less than the balance sheet valuation. That implies that members with a strict 10 year time horizon might prefer to liquidate the cooperative at its current asset value. Many members might have a longer time horizon and/or place a value in having the cooperative to continue to exist to provide benefits for future generations. The MV is also sensitive to the member's discount rate and would increase to 2.35 times allocated equity at an 8 percent discount rate.

Members with lower discount rates would turn down an offer to purchase the cooperative at its asset value and would instead elect to receive profit distributions. The MV valuation would be particularly useful to members considering a proposal to merge their cooperative with another cooperative firm. In these cases, members often essentially trade the equity in their existing cooperative for equity in the merged cooperative at some ratio of book value. Estimates of the MV of each cooperative would provide a fair basis for the equity conversion ratio. For example, an undisclosed cooperative in Oklahoma received an offer from an outside firm to sell the cooperative at a value representing a multiple of their allocated equity value. If the membership was determined to sell the FCFE value could have provided a benchmark to estimate the fair market value of their cooperative. The members were first considering to merge with another cooperative but due to differences in debt levels and equity. If both cooperatives would have had valuations based on free cash flows, the membership might have realized their cooperative were worth multiple times their allocated equity; thus, the potential merger partner would have had higher cash flows.

The MV also illustrates the impact of profit distribution and equity management strategies on the members' realized value. On average, when an additional 5 percent of total profits was distributed as cash patronage, MV increased by 11.12 percent. Similarly, when the equity revolving period was decreased by 1 year the MV increased by 0.69 percent. Of course, both of those alternatives reduce available cash flow for the cooperative. Cooperative boards would need to weigh those impacts on the members' realized value with the members' interest in reinvestment in infrastructure.

Finally, a member might wonder about the fair market value of the cooperative as an on-going business. Our FCFE provides the best estimate of that value which averaged 5.31 times greater than the allocated equity value. That value is, on average, over twice the value of the cooperative's assets. This implies that the group of case study cooperatives are creating

substantial value from their member's investments. Collectively, the cooperatives are clearly worth less dead (asset value) than alive (free cash flows to equity).

Like the MV, the FCFE values are sensitive to the choice of the discount rate. They are also impacted by the assumed growth rate of cooperatives, but are less sensitive to that assumption. At lower discount rates, the FCFE valuation increases. At an 8 percent discount rate ,the FCFE value increased by 132.7 percent with the ratio of FCFE to allocated equity being 12.53, implying that members should only consider offers over approximately twelve and a half times the face value of their equity.

The FCFE value might be particularly useful to a group of cooperative members who were not interesting in continued access to the cooperative's services and were considering liquidating the cooperative through sale to an outside firm. Our FCFE values indicated that our case study cooperatives had values ranging from 2.85 to 8.20 times that of their allocated equity. Members could use the FCFE as a benchmark in evaluating outside offers.

Final Conclusions

The valuation of 10 case study Oklahoma cooperatives revealed that an alternative value to a traditional asset based approach should be considered when assessing the value of a cooperative. This information should be relevant to all members of a cooperative when faced with decisions about the future of the cooperative as well as personal investment decisions on the farm. The FCFE method posed many difficulties in application to each cooperative because of the complex nature of this method. However, we believe this method was more representative of the true value of the firm compared to the book value of the firm in the final year of financial information obtained.

As previously mentioned, the simplistic concept of the FCFE method intuitively proves to be the most theoretically correct method but the difficulty in applying a standardized business valuation formula arises because of the lack of a market price for stock and the fact that the owner's property rights to future cash flows are based on future use and not stock ownership. Other difficulties were met such as the reasonableness of projections based on the previous 6 years of financial data. Historical data is ultimately a representation of past performance, but isn't always an accurate representation of future operations. The reasonableness of the projections for each of the ten years that were discounted is the underlying driver of the final value for the FCFE method.

Further Research

The concept of the discounted economic income method is simplistic in nature, however, the application of this method is very difficult. As previously mentioned, some common errors associated with the discounted economic income method include: inappropriately matching the discount rate with the economic income measure, confusing discount rates with capitalization rates, assuming that recent past history represents the best estimate for forecasting economic income, forecasting growth beyond what the capital being valued will support, using an inappropriate number of periods when discounting a terminal value and using assumptions that yield a standard or basis of value that is inappropriate for the specific valuation engagement. Because of the difficulty in application and common errors of discounted cash flow methods, further research is needed to support key assumptions such as an appropriate discount rate and asset growth rate to be applied or generally accepted when assessing the value of a cooperative. Much more support exists in the corporate world, but much is lacking in the field of agriculture and more specifically addressing the unique characteristics of a cooperative.

The opportunity for cooperative database expansion is readily available and would assist in the valuation of cooperatives when making key assumptions, such as an asset growth rate. Based on the 10 Oklahoma cooperatives that were chosen for this research, the total asset growth rate and fixed asset growth rate was collectively on average 18.6 percent and 12.1 percent, respectively. It is not reasonable to assume that cooperatives currently or recently investing in infrastructure would necessarily keep reinvesting in fixed assets at this rate. Therefore, we assumed a much more conservative growth rate for the purpose of this study. If we could have obtained data from the entire population of cooperatives in Oklahoma with regards to this attribute, it could have aided in the decision to apply a consistent growth rate during the analysis of the valuations.

Further the ambiguity in a discount for lack of marketability and in a discount rate could be supported with additional research specifically related to agricultural cooperatives and farmers. Historically, net returns on farming operations have been less than that of the stock market on average. Therefore, farmers may be discounting the use of the cooperatives at a lesser rate than that of a typical non-farm investor in the stock market. As outlined previously, agricultural projects have been known to use lower discount rates than that which is used in the corporate world. Further research providing additional support on discount rates is essential for future valuations of agricultural cooperatives.

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APPENDICES

Appendix A- Details of Financial Projections

A cooperative financial simulation program developed at Oklahoma State University was used to develop 10 year projections for the case study cooperatives. Most of the fixed expense categories such as depreciation, maintenance and repairs, insurance and property tax were modeled based on their historic relationship with fixed asset levels. Personnel expense and residual expenses was based on the historical average dollar amount. Inventory and accounts receivable levels were modeled based on their historic relationship with farm supply sales. Investment in fixed assets was modeled at a constant 5% growth rate.

Profiles of equity by age of patron or age of stock (as appropriate) were obtained for each cooperative. Five of the ten case study cooperatives used an age of patron equity retirement system while the remainder used an age of stock system. Equity retirement triggers ranged from 18-20 years and from age 65 to 70. The historic profit distribution strategies of the case study cooperatives varied somewhat over the 6 year period from 2009 to 2014 of historical data due to drought years and cash flow issues. However, most cooperatives use the same profit distribution every year. It is difficult to determine the cash and retained patronage rate from audited financial statements because the patronage decision has not been established at the time the audited financial statements were available

Patronage for the previous year can be inferred from the cash flow statements and balance sheet but are impacted by the timing of the actual distribution which often coincides with the annual meeting. Patronage calculations are also impacted by the percent of nonmember business which is not generally listed on the audited financial statements.

To address the previously stated issues, phone interviews with the CEOs were conducted to determine what the CEO considered the most typical profit distribution between unallocated equity, qualified stock and nonqualified stock. The percentage of nonmember business for the most recent fiscal year was also obtained. Nine of the case study cooperatives distributed profits in a combination of cash and qualified stock, with the cash portion ranging from 21% to 50%. One cooperative distributed 30% cash and 70% nonqualified stock. None of the case study cooperatives retained member profits in the form of unallocated equity. The percentage of nonmember business ranged from 8% to 30%.

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